

REMARKS

Claim 1 is amended. New claims 25-31 are added. Claims 1-31 are pending in the application.

Claims 1-24 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Examiner states that the limitation of simultaneously providing gaseous metal and oxidizer to a reactor, as recited in each of independent claims 1, 6, 11 and 18, is not disclosed in the specification. The applicant disagrees.

The Examiner is reminded by direction to MPEP § 2163.02 that the standard for determining compliance with the written description requirement is “whether a claim defines an invention that is clearly conveyed to those skilled in the art at the time the application was filed”. The limitations recited in the claim “need not be described literally” in the specification. Additionally, when an amendment changes the scope of a claim, the written description requirement determination is based on “what is reasonably communicated to those skilled in the art” (MPEP § 2163.05 II). Applicant’s disclosure as originally filed clearly supports the limitation of simultaneously providing gaseous metals and flowing an oxidizer to the reactor as recited in independent claims 1, 6, 11 and 18.

Attention is directed to applicant’s disclosure at page 8, ¶ 2 through page 9, ¶ 1; and page 10, ¶ 1 through page 11, which discusses the flow rates of oxidizers and of the metal organic precursors being provided to the reactor. As discussed, the rate of flow of the oxidizers can be changed to affect a change in relative atomic concentration of barium and

strontium in the deposited layer. As further discussed, the use of various oxidizers and flow rates can affect the atomic percent of titanium in the titanate and increase or reduce the deposition rate of the BST film. The discussion set forth at these locations in applicant's disclosure reasonably communicate to one skilled in the art that metal precursors and oxidizers can be provided to the reactor simultaneously.

In addition to the specific locations in the specification noted above, applicant directs attention to the specification at page 9 wherein U.S. Patent Application Serial No. 09/905,320 is specifically incorporated by reference. Since the information in the incorporated specification "is as much a part of the application as filed as if the text was repeated in the application" it must be treated as part of the application as filed (MPEP § 2163.07(b)). The incorporated specification further supports the recited "simultaneously" providing gaseous metal precursors and gaseous oxidizers. For example, the incorporated specification at page 7 through page 11 sets forth methods of effecting homogeneity, deposition rate and atomic ratios of the barium, strontium and titanate by adjusting or varying the flow of the oxidizer during the deposition. Applicant's disclosure therefore clearly supports the recited limitation of providing gaseous metal precursors and simultaneously flowing gaseous oxidizer into a reaction chamber. Accordingly, applicant respectfully requests withdrawal of the § 112 rejection of independent claims 1, 6, 11 and 18, and of corresponding dependent claims 2-5, 7-10, 12-17 and 19-24, in the Examiner's next action.

Claims 1, 2, 4, 6, 7, 9 and 11-24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Senzaki, U.S. Patent No. 6,238,734 B1. The Examiner is reminded by direction to MPEP § 2131 that anticipation requires each and every limitation of a claim to

be disclosed within a single prior art reference. Claims 1, 2, 4, 6, 7, 9 and 11-24 are allowable over Senzaki for at least the reason that Senzaki fails to disclose each and every limitation in any of those claims.

Independent claim 1 is amended to correct a typographical error. Independent claim 1 recites forming a BST layer by simultaneously providing gaseous barium, strontium and titanium and simultaneously flowing at least one gaseous oxidizer to a reactor. Senzaki discloses mixing two or more metal precursors with an oxygen source prior to depositing a multiple metal compound layer (col 3, lns 35-38), the metals being selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, thallium, tin, lead, antimony, bismuth, lithium, sodium, potassium, rubidium, cesium, beryllium, magnesium, calcium, strontium, barium, scandium, yttrium, lanthanum, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, rhenium, iron, ruthenium, osmium, cobalt, rhodium, iridium, nickel, palladium, platinum, copper, silver, gold, silicon and cerium. As set forth in the MPEP § 2131.02 when it is "necessary to select portions of teaching within a reference and combine them . . . to arrive at a specific composition", anticipation requires one of ordinary skill in the art to be able to "at once envisage" the specific compound. The extensive list of potential metals disclosed in Senzaki does not teach the specifically recited combination of barium, strontium and titanium. Further, Senzaki does not disclose any specific examples having the recited barium strontium and titanium combination. One of ordinary skill in the art therefore would not be able to "add once envisage" the specific combination of barium, strontium and titanium as recited in claim 1. Accordingly, independent claim 1 is not anticipated by Senzaki.

Dependent claims 2 and 4 are allowable over Senzaki for at least the reason that they depend from allowable base claim 1.

Independent claims 6, 11 and 18 each recited simultaneously providing gaseous barium, gaseous strontium and gaseous titanium and flowing at least one gaseous oxidizer to a reactor. Independent claims 6, 11 and 18 are allowable over Senzaki for at least reasons similar to those discussed above with respect to independent claim 1. Dependent claims 7, 9, 12-17 and 19-24 are allowable for at least the reason that they depend from corresponding allowable base claims 6, 11 and 18.

Dependent claims 3 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senzaki. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine references teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 3 and 8 are allowable over Senzaki for at least the reason that Senzaki fails to disclose or suggest each and every limitation in either of those claims.

As discussed above, Senzaki does not disclose the claim 1 and claim 6 recited methods of forming a barium strontium titanate dielectric layer by simultaneously providing gaseous barium, gaseous strontium and gaseous titanium, and flowing at least one gaseous oxidizer into the reactor. Further, based on the unlimited potential combinations of metals based upon the list of metals disclosed by Senzaki (col 6, lns 34-42, discussed above), and the lack of examples suggesting the recited barium, strontium and titanium, Senzaki does not suggest the recited method comprising simultaneously providing gaseous

barium, gaseous strontium, gaseous titanium, and flowing at least one gaseous oxidizer to a reactor. Accordingly, independent claims 1 and 6 are not rendered obvious by Senzaki. Dependent claims 3 and 8 are allowable as non-obvious over Senzaki for at least the reason that they depend from corresponding allowable base claims 1 and 6.

Dependent claims 5 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senzaki in further view of Kang, U.S. Patent No. 6,127,218. As discussed above with respect to independent claims 1 and 6, Senzaki does not disclose or suggest the recited method comprising simultaneously providing gaseous barium, strontium and titanium, and flowing at least one gaseous oxidizer to the reactor. Kang discloses methods of forming ferroelectric films utilizing a first oxidant and a second oxidant. The Kang disclosure does not disclose or suggest the claim 1 and 6 recited simultaneously providing gaseous barium and strontium within a reactor, providing gaseous titanium within the reactor and flowing at least one gaseous oxide to the reactor. As combined, Senzaki and Kang fail to disclose or suggest the claims 1 and 6 recited method of forming a barium strontium titanate dielectric layer comprising simultaneously providing gaseous barium and strontium, providing gaseous titanium, and flowing at least one gaseous oxidizer to a reactor. Accordingly, independent claims 1 and 6 are not rendered obvious by the combination of Senzaki and Kang and are allowable over these references. Dependent claims 5 and 10 are allowable over the combination of Senzaki and Kang for at least the reason that they depend from corresponding allowable base claims 1 and 6.

New claims 25-31 do not add "new matter" to the application since each is fully supported by the specification as originally filed. Claims 25-30 are supported by the

specification at, for example, page 5, ¶ 2 through page 6, ¶ 1. New claim 31 is supported by the specification at, for example, page 9, line 21 through page 10, line 12.

Claims 6, 7, 8, 10 and 18-20 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of co-pending Application No. 09/776,217. Enclosed is applicant's terminal disclaimer to obviate such rejection.

For the reasons discussed above, claims 1-24 are allowable, and claims 25-31 are believed allowable. Accordingly, applicant respectfully requests formal allowance of claims 1-31 in the Examiner's next action.

Respectfully submitted,

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Group Art Unit.....1762
Examiner Fuller, Eric B.
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Title: Chemical Vapor Deposition Methods of Forming Barium Strontium Titanate
Comprising Dielectric Layers

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING
RESPONSE TO APRIL 30, 2002 FINAL OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

1. (Twice Amended) A chemical vapor deposition method of forming a barium strontium titanate comprising dielectric layer, comprising:
positioning a substrate within a chemical vapor deposition reactor; and
simultaneously a) providing gaseous barium and strontium within the reactor by flowing at least one metal organic precursor to the reactor, b) providing gaseous titanium within the reactor, and c) flowing at least one gaseous oxidizer to the reactor under conditions effective to deposit a barium strontium titanate comprising dielectric layer on the substrate, the oxidizer comprising ~~comprising~~ H₂O.

New claims 25-31 are added.